

DISCOVERY OF *AJUGA CHAMAEPITYS* (LAMIACEAE) NATURALIZED IN TEXAS

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ABSTRACT

Ajuga chamaepitys is reported as naturalized in a horse pasture along the eastern banks of White Oak Creek in Gillespie County of the Edwards Plateau. This is the second naturalized species of *Ajuga* known in Texas. The restricted distribution of this species suggests that it was established by adulterated forage transported with horse stock.

Ongoing floristic inventory in the Edwards Plateau of south-central Texas has resulted in the discovery of naturalized populations of *Ajuga chamaepitys* (L.) Schreb. This is the third state of the USA where this species has been documented (Virginia, Maryland, and Texas).

Voucher specimens: TEXAS. Gillespie Co.: Terra Linda Estates, ca. 15 km at 356 degrees from Kerrville (Kerr Co.), lat. 30°10'43.58", long. 99°08'55.62", ca. 595 m elev., 6 Apr 2015, *W.C. Holmes, J.R. Singhurst & J.N. Mink 16134* (BAYLU); same general location, lat. 30°11'01.22", long. 99°08'41.63", same collectors and date, *16135* (BAYLU); same general location, lat. 30°11'18.68", long. 99°08'11.30", same collectors and date, *16130* (BAYLU). Figure 1.

The Gillespie County pasture, which is about 1.9 km long and varies from about 50 to 230 m in width, was densely and evenly covered with *Ajuga*. Associated vegetation within the pasture included *Nassella leucotricha*, *Salvia farinacea*, *Marrubium vulgare*, *Glandularia bipinnatifida*, *Verbena halei*, *Ratibida columnifera*, *Lesquerella recurvata*, *Scutellaria drummondii*, *Arenaria* sp., *Evax* sp., and *Chaerophyllum tainturieri*. Peripheral herbaceous vegetation and woody shrubs and trees included *Desmodium paniculatum*, *Desmodium psilophyllum*, *Ulmus crassifolia*, *Juniperus ashei*, *Quercus buckleyi*, *Celtis laevigata*, with *Taxodium distichum* and *Platanus occidentalis* along the littoral zone of White Oak Creek.

The genus *Ajuga* comprises 40-50 species of decumbent and erect annuals and perennials in North Africa, Mediterranean Europe, Great Britain, Israel, Asia, and Australia, distributed mostly in cooler regions (Cheifetz et al. 1999). *Ajuga chamaepitys* is native to central and southern Europe, the eastern Mediterranean region, and North Africa. None of the species are native to the Western Hemisphere (Diggs et al. 1999).

Until now, only *Ajuga reptans* L. was known from Texas (Cory & Parks 1937; Gould 1962; Correll & Johnston 1970; Hatch et al 1990; Johnston 1990; Jones et al. 1997; Turner et al. 2003; Hannick et al 2013). *Ajuga chamaepitys* was first reported in the USA in 1981 from Virginia (Harvill et al. 1981) and later from Maryland (Brown & Brown 1984). Three other species of *Ajuga* are known adventives or have escaped cultivation in North America (Radford et al. 1965; Strausbaugh & Core 1977; Kartesz 2015): (1) *A. genevensis*, in the northeastern USA and southeastern Canada (Gleason & Cronquist 1991; Brouillet et al. 2006; Kartesz 2015), (2) *A. reptans*, widespread throughout the USA except the Dakotas, Minnesota, Nebraska, Wyoming, Colorado, New Mexico, Nevada, California and Arizona (Gleason & Cronquist 1991; Brouillet et al. 2006; Kartesz 2015), and (3) *A. pyramidalis*, known only from Washington County, Mississippi (Bryson & Skojac 2011). The following key, adapted from Stace (1997), distinguishes the three species in the southern USA.

KEY TO *AJUGA* NATURALIZED IN SOUTHERN USA

- 1. Annuals; leaves dissected; plants neither stoloniferous nor rhizomatous; corollas yellow
..... ***Ajuga chamaepitys***
- 1. Perennials; leaves subentire or serrate; plants stoloniferous or rhizomatous; corollas blue, pink or white.
 - 2. Plants rhizomatous; all bracts longer than flowers; stem puberulence continuous around stems
..... ***Ajuga pyramidalis***
 - 2. Plants stoloniferous; upper bracts shorter than flowers; upper part of stem puberulence discontinuous around stems (only on 2 opposite sides) ***Ajuga reptans***

Ajuga chamaepitys in the Texas flora may remain localized, given its disjunct pattern of distribution in the USA (Virginia-Maryland and Texas), coupled with its known edaphic requirements of limestone, calcareous substrates, and calciferous soils (Lousley 1950; Stace 1997). Although Turrill (1948) described a large-scale ecological cline in the geographic distribution of the species from Asia Minor across Europe, this plant is designated by others as uncommon, decreasing or restricted in England (Lousley 1950; Stace 1997). Jim Scuddy, land manager of Terra Linda Estates, observes that the plant has been present in the Gillespie County horse pasture since the 1980s; no dispersal of *A. chamaepitys* has been observed outside of this area.

The establishment of *Ajuga chamaepitys* in the USA probably is connected to horseracing and horse recreational pursuits and the importation of horse stock from Europe and the Middle East (Weatherby 1791; Shouse 1908; Prior 1935; Wentworth 1938; Lightcap 1940) — seeds may have arrived via ruminant gut remnants or adulterated forage. Livestock forage as a vector for plant propagules is well known (Dewey 1897; Hillman & Henry 1928; Clines 2005) and interstate regulations related to weed-free hay are lax.

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Figure 1. *Ajuga chamaepitys*, ground-pine or yellow bugle, in Gillespie Co., Texas, 6 April 2015. Photo by Jason Singhurst.

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